LINEEYE

COMPACT PROTOCOL ANALYZER

LE-1500

Quick Start Guide

When you unpack the product, make sure of the following.

☐ AC Adapter: 1
☐ RS-232C Monitor Cable : 1
☐ AUX Cable: 1
☐ External Signal I/O Cable: 1
☐ Utility CD: 1
☐ Carrying Bag: 1
☐ Quick Start Guide (this booklet): 1
☐ Registration Card, Warranty: 1

Please let us know if you find any damage to the product or accessories lacking.Save the outside package and contact LINEEYE or LINEEYE distributors.

---Note---
The Nickel-Hydrogen battery is built into the product. It is not full charged to keep the quality. Before using the product, charge the battery first. If you dispose the product, follow the regulations of your city.

The utility CD attached to the product contains the instruction manual.
Refer to the instruction manual for more detailed operation and important notes.

Read this first

Thank you for your purchase of LE-series.

To use it correctly, you are advised to read and understand this booklet and the instruction manual stored in the CD thoroughly.

When you encounter some problems, you will find helpful information.

Please do not use the analyzer in the following conditions.

[Description of the symbol and mark]

⚠ Warning	If the device is used without followings, there is a possibility of accidents, such as a death or a serious injury.
⚠ Caution	If the device is used without followings, there is a possibility of accidents, such as a injury, or material damage.

⚠ Warning

■ Do not use the AC adapter or battery excepting the one LINEEYE designated.This may cause of exothermic reaction, ignition, electric shock, and malfunction.

■ Do not disassemble, modify or repair analyzer.This may result in a injury, electric shock, and ignition.

■ Turn off the power and unplug the analyzer immediately when smoke or smells emanated. Continuous use may result in an electric shock, burn and ignition.

■ Do not use the analyzer where there is inflammable gas. This may result in fire and explosion.

■ Turn off the power and unplug the analyzer immediately when a liquid or foreign substance get into the analyzer.Continuous use may result in ignition, electric shock and malfunction.

■ Do not get the analyzer wet in water. This may cause of electric shock and malfunction.

■ Do not put the analyzer in fire or place near the heater. This may result in a injury, fire and explosion.

■ Never plug or unplug the AC adapter in wet hands. This may result in an electric shock.

■ Do not touch the AC adapter or cables when out-breaking the thunder. This may result in an electric shock.

■ Do not extend the plug to multi-outlets. This may result in the ignition.

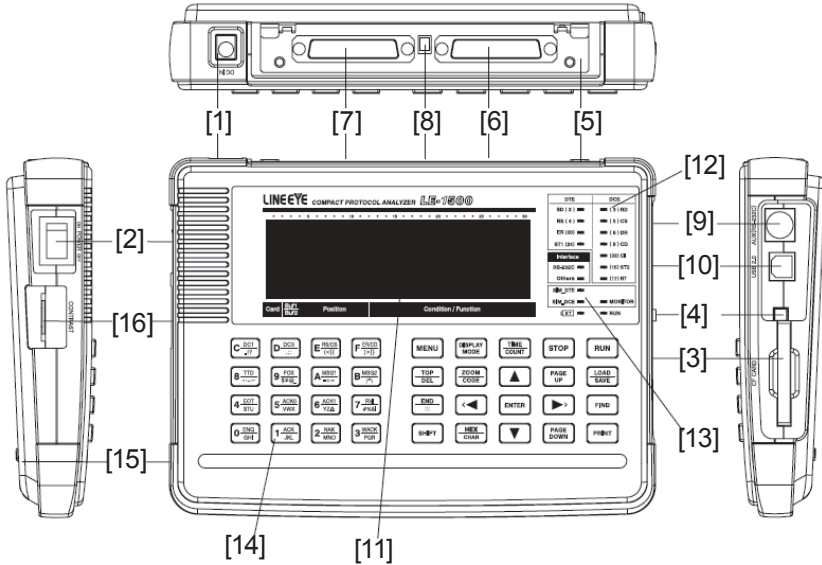■ Remove the dust from the AC adapter to avoid the ignition.

⚠ Caution

■ Do not give impact to the analyzer, such as dropping and hitting.

■ When removing/connecting the cable, hold the connector of the cable.

■ When plugging/unplugging the AC adapter, hold the body of the AC adapter.

■ Do not place the analyzer where is not flat, or vibrated place.

■ Do not place the analyzer where temperature or humidity is above the specification or sudden temperature change.

■ Do not place the analyzer affected by direct sun or near the fire.

■ Do not place the analyzer in the strong magnetic field, or static electricity place.

■ Do not place the analyzer where there is leaking water or electricity.
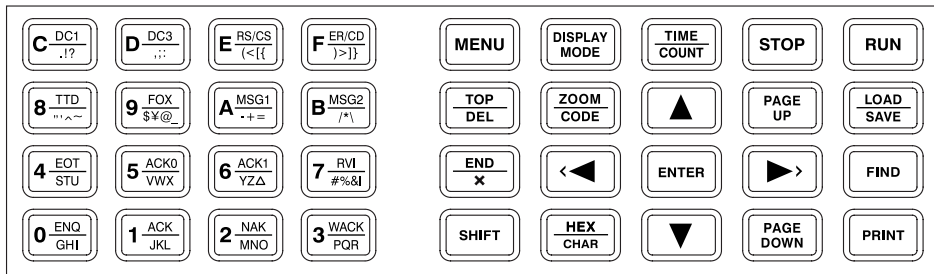
---- Contents ----

Nomenclature

General

	Name	Function
1	AC Card Adaper Plug	Connects the AC adapter.(It deals with the polarity of plus and negative.)
2	Power Switch	Turns the power on/off.
3	Memory Card Slot	The inlet for a memory card.
4	Memory Card Eject Button	Press to remove a memory card.
5	Interface Sub-Board	A sub-board equipped with RS-232C and RS-422/485 (RS-530) interface.
6	RS-232C Port	Measurement port for RS-232C (V.24).
7	RS-530 Port	Measurement port for RS-422/485 (RS-530).
8	External Signal I/O terminal	Outputs/inputs the external trigger. Connects the external signal I/O cable.
9	AUX(RS-232C) Port	Used to input or output external equipment equipped with RS-232C interface.
10	USB Port	Uses for remote-control from the PC and updating to the latest firmware.
11	Liquid Crystal Display	Wide view angle and high contrast liquid crystal display.
12	Line State LED	Indicates logical status of signal line on the target interface.
13	Action State LED	Indicates the status of the measurement port and operation mode. [RUN] stands for measuring. [BT] stands for low battery (red blinking) or charging (green light).
14	Keypad	Press to enter commands and data.
15	Battery Cover	Open only when replacing the nickel-hydrogen battery.
16	Contrast Adjust Knob	Adjusts the display contrast.

C DC1 .!? | D DC3 ,;: | E RS/CS (<[{ | F ER/CD)>]} | MENU | DISPLAY MODE | TIME COUNT | STOP | RUN

8 TTD "'\~ | 9 FOX $¥@_ | A MSG1 .-+= | B MSG2 /*\ | TOP DEL | ZOOM CODE | ▲ | PAGE UP | LOAD SAVE

4 EOT STU | 5 ACK0 VWX | 6 ACK1 YZΔ | 7 RVI #%&I | END × | ◄ | ENTER | ►› | FIND

0 ENQ GHI | 1 ACK JKL | 2 NAK MNO | 3 WACK PQR | SHIFT | HEX CHAR | ▼ | PAGE DOWN | PRINT

Key	Function
[RUN]	Starts monitoring, measuring or testing operation.
[STOP]	Stops monitoring, measuring or testing operation. Interrupts printing.
[MENU]	Returns to the top menu for selecting functions and setting conditions. *Returns to the previous screen.
[DISPLAY MODE]	Displays the monitored or measured data. Switches over to the display format.
[TIME/COUNT]	Switches to counter/timer display and timing waveform display.
[LOAD/SAVE]	Switches over to the file management function of CF card.
[FIND]	Switches over to the retrieval function.
[PRINT]	Switches over to the printing function.
[HEX/CHAR]	Switches over the monitored data displayed in char. to one in hexadecimal.
[ZOOM/CODE]	Zooms up in the timing waveform screen. Changes the display code of monitored data.
[PAGE UP]	Goes to previous data. Moves the setting items upward.
[PAGE DOWN]	Goes to next data. Moves the setting items downward.
[▲] , [▼]	Scrolls the data line.Moves the cursor on the condition setting screen.
[◄] , [►]	Scrolls the displayed data character by character.Changes or selects the setting item on the condition setting screen.
[ENTER]	Definite input for execution of function or a command.Pauses the display when pressing the key during the measurement.
[0]~[F]	Enters the corresponding numerical values.Selects an item number or the data to be sent.
[TOP/DEL]	Displays the top section of data. Deletes the entry indicated by the cursor.
[END/X]	Jumps to the end of the screen. Enters data "Don't Care."
[SHIFT]	Press to use the expanded alternate function of each key.
[SHIFT] + [PRINT]	Prints the hard copy (screen image).
[SHIFT] + [FIND]	Sets configuration of retrieval condition.
[SHIFT] + [PAGE UP]	Moves to the setting help screen upward.
[SHIFT] + [PAGE DOWN]	Moves to the setting help screen downward.
[SHIFT] + [DISPLAY MODE]	Turns on/off the back-light. (Applicable models only)
[SHIFT] + [HEX/CHAR]	Selects the fixed transmission data.

*This booklet uses [+] mark, when two keys needs to be pressed at the same time.(e.g., [SHIFT] + [PRINT])

Charging the Battery

The Nickel-Hydrogen is fully charged in about 2.5 hours by the AC adapter.

Please charge the battery before using the product.

* The "BT" LED blinks in green when charging, and lights in green when completing the charge.

* The analyzer can perform the battery drive for about 8 hours with the full charge.

[Note]
Do not use the AC adapter or battery excepting the one LINEEYE designated.
If you are not going to use the analyzer for a long term, fill up the battery before putting back.
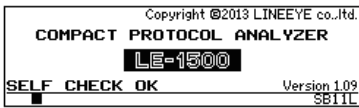After that, try to charge the battery every 6 months.
If the service time after charging becomes extremely short, the battery must be replaced with a new one. (Battery model: P-19S)

* Even though the service time becomes short within the warranty period, you need to purchase the new one because batteries are considered as consumable part.

Lithium Battery

The data of memory IC and timer IC is saved for about 10 years by built-in Lithium battery even if the power supply is OFF.

Turn on the Power, Software Reset

Copyright ©2013 LINEEYE co.,ltd.
COMPACT PROTOCOL ANALYZER
LE-1500
SELF CHECK OK   Version 1.09
                              SB11L

Turn on the power of analyzer (Press left side button.)
The opening screen with firmware version will be displayed after the self-check test.

* If "Self-check NG" is displayed, please contact LINEEYE distributors or LINEEYE directly.
* The latest firmware is available from LINEEYE web page.

Software Reset

To restore the initial conditions (factory setting) into the analyzer, turn on the power while pressing [Enter]+[Top/Del] keys. [Initialized!] will be displayed in the opening screen.

Calibration

Enable to have a diagnostics by the analyzer itself.

* After the calibration, it will go back to the initial conditions and capture memory will be erased.

Preparation   Remove all cables from the analyzer and insert the optional CF card. (if you have one)
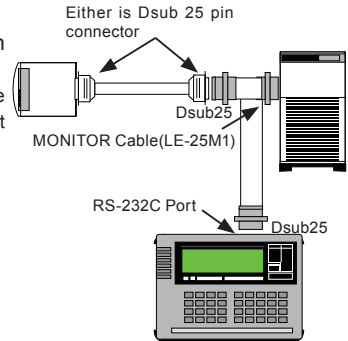
Operation   Turn on the power while pressing [1]+[D]. Press all keys one by one when the key marks ☐ are displayed. "--OK--" will be displayed if the result is fine. Turn off the power of analyzer.
               * If "NG" is displayed, please contact LINEEYE distributors or LINEEYE directly.
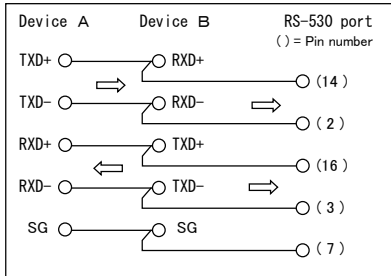
Connect to the Target Devices

Connect to RS-232C

■ To monitor the communication data
Connect the monitor cable (LE-25M1) to the Dsub 25pin connector of RS-232C for the target devices.
  * Connect the optional 9pin monitor cable (LE-259M1) to the Dsub 9pin connector of RS-232C for the Dsub 9pin target devices.

■ To have the transmission/reception (simulation) test
Set the interface condition according to the DTE/DCE specification and pin assignment of RS-232C cable for the target devices. (->P7)
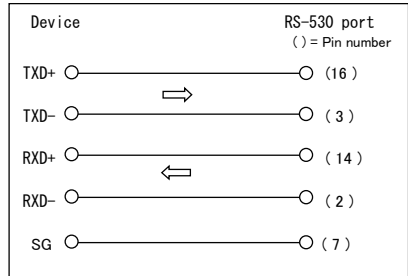
Either is Dsub 25 pin connector

Dsub25

MONITOR Cable(LE-25M1)

RS-232C Port

Dsub25

Connect to RS-422/RS-485

■ To monitor RS-422

Device A	Device B	RS-530 port ( ) = Pin number
TXD+	RXD+	(14)
TXD−	RXD−	(2)
RXD+	TXD+	(16)
RXD−	TXD−	(3)
SG	SG	(7)

■ To simulate RS-422

Device	RS-530 port ( ) = Pin number
TXD+	(16)
TXD−	(3)
RXD+	(14)
RXD−	(2)
SG	(7)

■ To monitor/simulate RS-485

Device A	Device B	RS-530 port ( ) = Pin number	Device C
TX/RX+	TX/RX+	(14)	TX/RX+
TX/RX−	TX/RX−	(2)	TX/RX−
SG	SG	(7)	SG

Terminal Block for RS-530
LE-530TB

RS-530 Port
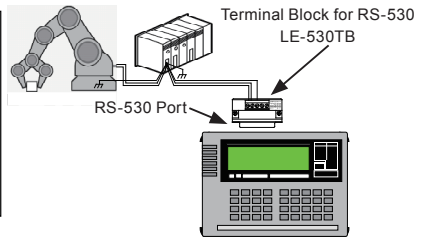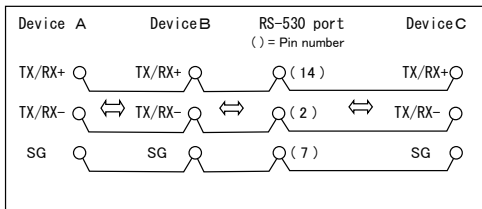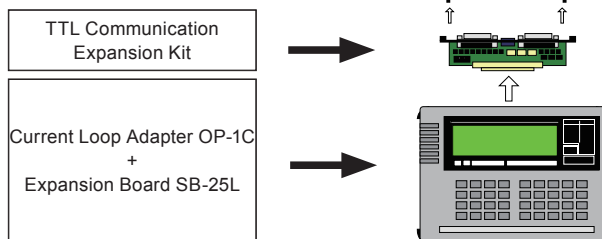
Connect to TTL or Current-loop

The optional expansion kit supports TTL level of synchronous communication (serial communication on microcomputer or LSI) at 1.8V/2.5V/3V/5V, or current-loop communication of 20-60mA.

TTL Communication Expansion Kit

Current Loop Adapter OP-1C
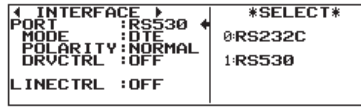+
Expansion Board SB-25L

Interface Setting

Press [Menu](top menu)->[1]"INTERFACE" to set the interface setting of the target device.

■ PORT (Selecting Ports to Measure)
   Select "RS232C" to measure RS-232C and "RS530" to measure RS-422/485(RS-530).

```
◄ INTERFACE ►        *SELECT*        ◄ INTERFACE ►        *SELECT*
PORT    :RS232C◄                     PORT    :RS530 ◄
MODE    :DTE         0:RS232C        MODE    :DTE         0:RS232C
POLARITY:NORMAL      1:RS530         POLARITY:NORMAL      1:RS530
                                     DRVCTRL :OFF
LINECTRL :OFF                        LINECTRL :OFF
```

■ MODE (DTE/DCE Switch)
   Select the specification of signal input/output for the measurement port while using Simulation or BERT function.
   When using Monitor function, it is not necessary to set.

■ POLARITY
   Select "NORMAL"for normal measurement.
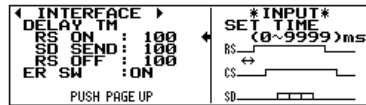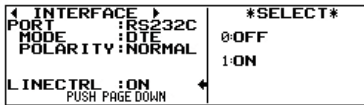
■ DRVCTRL (Controlling Drivers)
   Select the RS-422/485 driver control of analyzer for Simulation function.
   Normally, select "OFF" for RS-422 test, and "AUTO" for RS-485 test.

■ LINECTRL (Line Control)
   Normally, select "OFF". Select "ON" to control timing between line changes and transmission automatically.
   Press [Page Down] for detailed setting.

```
◄ INTERFACE ►        *SELECT*        ◄ INTERFACE ►        *INPUT*
PORT    :RS232C                      DELAY TM             SET TIME
MODE    :DTE         0:OFF           RS ON  :  100 ◄      (0~9999)ms
POLARITY:NORMAL      1:ON            SD SEND:  100     RS
                                     RS OFF :  100         ↔
LINECTRL :ON                         ER SW  :ON        CS
      PUSH PAGE DOWN                       PUSH PAGE UP  SD
```

Measurement Function

Press [MENU](top menu) and move " ►◄" mark to select the appropriate function.

```
MONITOR  SIMULATE    SETUP
►ONLINE   MANUAL      0:CONFIG
 DELAY    FLOW        1:INTERFACE
          ECHO        2:TRIGGER
                      3:CONDITION
BERT                  4:WAVE MON
 BERT                 5:AUTO CONF
```

ONLINE Function	Monitor communication data at real time (->P10)
DELAY Function	Measure the delay time of the signal changes and voltage of SD/RD/ER/CD on RS-232C.
BERT Function	Measure the transmission quality of communication line. (->P12)
MANUAL Function	Have the transmission/reception test by key operation. (->P11)
FLOW Function	Have the flow control on Simulation function.
ECHO Function	Echo back function

*Refer to the instruction manual stored in the CD to use the Delay, Flow and Echo functions.

Condition Setting

Set the environmental conditions required to operate the analyzer.

Press [MENU](top menu) ->[3]"CONDITION"to select the conditions.

```
◄   CONDITION   ►
➜0:BUFFER SELECT
  1:RECORD & DISPLAY CONTROL
  2:PRINT OUT CONDITION
  3:AUX CONDITION
  4:AUTO RUN
  5:TIME & DATE SET
  6:OTHER FUNCTION
```

No.	Item	Setting Conditions
0	BUFFER SELECT	Select the allocation of split buffer and protection of buffer. Select On/Off of buffer full stop and Auto save function.
1	RECORD & DISPLAYCONTROL	Record and display the idle time, time stamp and line status. Select on/off of BSC translation.
2	PRINT OUT CONDITION	Set printing conditions and select an output port.
3	AUX CONDITION	Set the communication conditions on AUX (RS-232C) port.
4	AUTO RUN	Set On/Off of the automatic start/ stop and starting/ending time. Set On/Off of the automatic RUN when powering on.
5	TIME & DATE SET	Set time and date (Set the built-in clock).
6	OTHER FUNCTION	Select on/off of the key click sound, and operation method at the time of battery warning.Set the time of turning off the back-light automatically. Start measuring by pressing [RUN] key once or twice.

Press a number key corresponding to each item to set the configuration (or move[▲] [▼] and then press [ENTER].)

For example, press [5] to set the time and date.

```
◄ TIME & DATE ►
  PRESENT [13 01/21  20:44:10]

    DATE    '13 01/21
    TIME    20:43:20
  ◄,►,▲,▼ SELECT & INPUT DATA
```

1: Current time and date is displayed in the first line.
2: Move the cursor to change the setting.
3: Input using [0] [9] keys.
4: Input the date information of year (last 2 digits), month and day.
   Input the time information by H/D/S (24hours)
5: Press [Enter] to reflect the setting.
   * To cancel inputting, press [Menu] key. (Not [ENTER] key)

Communication Condition

Press [MENU] -> [0] "Configuration" to set the communication conditions.
Move " "mark by pressing [▼],[▲],[PAGE DOWN],[PAGE UP] keys or press [0] - [F] keys to set the configuration.

```
◄CONFIGURATION►     *SELECT*
PROTOCOL  :ASYNC ◄
S-SPEED   :9600     0:ASYNC
R-SPEED   :9600
CODE      :ASCII    1:ASYNC(PPP)
CHAR BIT:8
PARITY    :NONE
     PUSH PAGE DOWN
```

■ PROTOCOL

Select ASYNC for Asynchronous communication.
■ S-SPEED (Sets the transmission communication speed.)
■ R-SPEED (Sets the reception communication speed.)

```
◄CONFIGURATION►     *SELECT*
PROTOCOL  :ASYNC    0:110
S-SPEED   :9600  ◄  1:1200
R-SPEED   :9600     2:9600
CODE      :ASCII    3:19200
CHAR BIT:8          4:38400
PARITY    :NONE     F:USER
     PUSH PAGE DOWN  PUSH SHIFT+PAGE DOWN
```

When "S-SPEED" is set, "R-SPEED" is automatically set.
Press [F] to set any communication speed by 4 effective digits.
For example, to set speed of 123.4Kbps, Input [1] , [2] , [3] , [C] (.) , [4] , [D](k)

```
◄CONFIGURATION►     *SELECT*
PROTOCOL  :ASYNC    0:ASCII
S-SPEED   :9600     1:EBCDIC
R-SPEED   :9600     2:EBCDIK
CODE      :ASCII ◄  3:JIS7
CHAR BIT:8          4:JIS8
PARITY    :NONE     PUSH SHIFT+PAGE DOWN
```

■ CODE (Sets the display code on the screen.)
■ CHAR BIT (Sets a character bit length.)
■ PARITY (Sets parity bit)

"MP" is used for communication adding Multi-processor bit.

Press [PAGE DOWN]

```
◄CONFIGURATION►     *SELECT*
PROTOCOL  ASYNC
STOP BIT:1       ◄  0:1bit
BCC       :NONE
BGN CHAR:0102       1:2bit
END CHAR:0317
ITB CHAR:1f
     PUSH PAGE UP DOWN
```

■ STOP BIT (Sets a stop bit length)

It is valid only for Simulation function.
For receiving data, 1 bit is set in spite of any setting.
■ BCC (Sets block check code)

When "OFF" is set, block check is not executed.
■ BGN CHAR (Sets a calculation start character for BCC)
■ END CHAR (Sets a calculation end character for BCC)

```
◄CONFIGURATION►     *SELECT*
PROTOCOL  ASYNC     0:NONE
STOP BIT:1          1:LRC ODD
BCC       :NONE  ◄  2:LRC EVEN
BGN CHAR:0102       3:CRC-16
END CHAR:0317       4:CRC-ITU-T
ITB CHAR:1f         5:CRC-6
     PUSH PAGE UP DOWN  6:CRC-12
```

```
◄CONFIGURATION►     *INPUT*
PROTOCOL  ASYNC
STOP BIT:1          SET 1~2
BCC       :NONE        CHARACTER
BGN CHAR:0102    ◄
END CHAR:0317       (00~FF)
ITB CHAR:1f         (HEX CODE)
     PUSH PAGE UP DOWN
```

■ ITB CHAR (Sets an ITB character)

Not need to set for normal use.

Press [PAGE DOWN]

```
◄CONFIGURATION►     *SELECT*
PROTOCOL  ASYNC
TRANSPRT:OFF     ◄  0:OFF
DLE CHAR:10
SEQUENCE:LSB        1:ON
FRM TIME:  5
FRM END:
     PUSH PAGE UP
```

■ TRANSPRT

Set "OFF" for normal use. Set "ON" to measure in Transparent mode.
■ DLE CHAR (Sets a DLE character for transparent mode)

Not need to set for normal use.

```
◄CONFIGURATION►     *INPUT*
PROTOCOL  ASYNC
TRANSPRT:OFF        SET FRAME
DLE CHAR:10            END TIME
SEQUENCE:LSB     ◄
FRM TIME:  5        (1~100)ms
FRM END:            (DECIMAL)
     PUSH PAGE UP
```

■ SEQUENCE (Sets bit sequence)

Set "LSB" first for ASYNC communication.
■ FRM TIME (Sets a non-communication time considered to be a frame end)

When the time reached to the setting, it ends the frame.

```
◄CONFIGURATION►     *INPUT*
PROTOCOL  ASYNC
TRANSPRT:OFF        SET 0~1
DLE CHAR:10           CHARACTER
SEQUENCE:LSB
FRM TIME:  5        (00~FF)
FRM END: 0d      ◄  (HEX CODE)
     PUSH PAGE UP
```

■ FRM END (Sets the frame end characters)

When receiving the frame end characters, it ends the frame.
The left screen shows the setting of carriage return (0Dh).

On-line Monitor Function

This function records communication data in the capture buffer without affecting the communication.

Also, it displays clearly following each communications protocol.

Operation

```
MONITOR  SIMULATE    SETUP
▶ONLINE◀  MANUAL    0:CONFIG
 DELAY    FLOW      1:INTERFACE
          ECHO      2:TRIGGER
                    3:CONDITION
 BERT               4:WAVE MON
 BERT               5:AUTO CONF
```

Press [MENU](top menu) and select "ONLINE".
Press [0] to set the configuration. (->P9)

```
◀ REC & DISP ▶      *SELECT*

 IDLE TM :OFF    ◀  0:OFF
 TM STAMP:OFF       1:*100ms
 LINE REC:OFF       2:*10ms
                    3:*1ms
 LINEDISP:RSCSCDER
 BSC     :OFF
```

Press [Menu]->[3]->[1] to set the time stamp, idle line, line state, and BSC translation.
Set other configuration if necessary.(->P8)
Press [RUN] to start measuring, and the RUN LED will light.
Then, the measured data will be displayed on the screen.

```
↕TMSP READ_MODEL-NAME TMSP · · · ·↕
  10:04:27 · · · · · · · · · · · · · 10:06:32 LINEE↕
↕ · · · · · · · · · · · · · · · · · · · · · · · · ·↕
↕YE-LE1500█                              ↕
↕                                        ↕
      ■        ASCII        << PAUSE >>
```

➡ SD data

⬅ RD data

[ENTER] The screen is temporarily paused. Press it again to continue.

[STOP] Stop measuring.

○ Change the Display Mode
Press [Display Mode] to change the mode.

➤ Data display → Line state display(*1) → Translation display(*2) → Display per the frame(*3)

*1: It is displayed if recording the line state.
*2: It is displayed if setting "On" on translation display.
*3: It is displayed if recording the time stamp.

○ Change the Display Code
Press [HEX] to change the display codes to HEX. To return to the former code, press it again.
Pressing [ZOOM/CODE] changes the display code in following order.

➤ ASCII → EBCDIC → EBCDIK → JIS7 → JIS8 → HEX

Baudot ← IPARS ← Transcode ← EBCD

○ Timer and Counter

```
         SET        NOW
TIMER  0  [     1]  [    0]
TIMER  1  [     1]  [    0]
COUNTER0  [     3]  [    0]
COUNTER1  [     1]  [    0]
COUNTER2  SD [       15]
COUNTER3  RD [       14]
      ■   TM/CT   9600/  9600
```

Press [TIME/COUNT] to display the value of time and counter.
"Timer0, 1" "Counter0, 1" is used when measuring with trigger function. (->P13)
"Counter 2, 3" is used when counting the total number of SD/RD data after starting the measurement.

○ Scroll, Jump, Search
Scroll the screen by pressing [PAGE UP],[PAGE DOWN] after the measurement.

Jump function Specify the position of measured data by [0]-[9]keys and press [Enter].
Search function Specify the search conditions by [SHIFT]+[FIND]keys and press [Find] (or "▲","▼") or [Enter].

Simulation Function

With the simulation function, the analyzer acts as the counterpart to the target device and performs transmission/ reception tests.

In this section, it only describes the MANUAL mode, which sends the data registered in transmission table corresponds to the keys. To know about other modes, refer to the instruction manual stored in the CD.
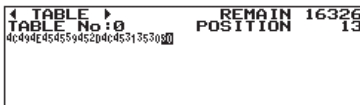
Operation

Press [MENU](top menu) and select "MANUAL".
Press [0] and set the communication condition. (->P9)

Press [Menu]->[9] and display the summary screen of data tables.
There is "0" to "F" transmission data tables which corresponds to the key board.
Select the data table by [0]-[F] key and press [ENTER].

Input data by [0]-[F] keys in HEX. To input data in alphabet, press [SHIFT]+[HEX/CHAR].
Press [HEX/CHAR] to change the input data in HEX.

For more details of setting, such as BCC insertion ([SHIFT]+[ENTER]), Parity error ([SHIFT]+[E]), copy/paste and delete, refer to the instruction manual stored in the CD.
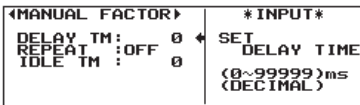
Press [MENU]->[A](Manual Factor), and set the "DELAYTM" (Space between characters), "REPEAT" (repetitive transmission), and "IDLETM" (Interval of repeat transmission).

Press [RUN] and then [0]-[F] key corresponds to the transmission data table.
Transmission data and reception data can been seen on the screen.
Press [SHIFT]+[0]-[D] key to send the pre-set data.
Press [SHIFT]+[E] or [F] to turn on/off the control line of RS(RTS)/CS(CTS) and ER(DTR)/CD(DCD).
Press [STOP] to end the measurement.

(e.g.,) Send "ENG" at DCE mode (->P7). When receiving "TEST1$^{C}R^{L}F$", send "NG2$^{C}R^{L}F$" on the table1 .

Receive "TEST1$^{C}R^{L}F$".

Send "ENG(05h)" by pressing [SHIFT]+[0].

Send "NG2 $^{C}R^{L}F$" by pressing [1].

Data Table

[RUN]
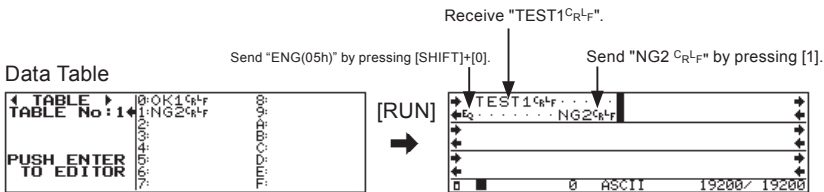
Bit Error Rate Test Function

With Bit Error Rate Test function, the analyzer evaluates the quality of a data communication line of target devices (modems and converters etc.).
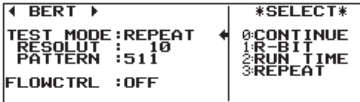
(e.g.,) Connection of Loop-back test
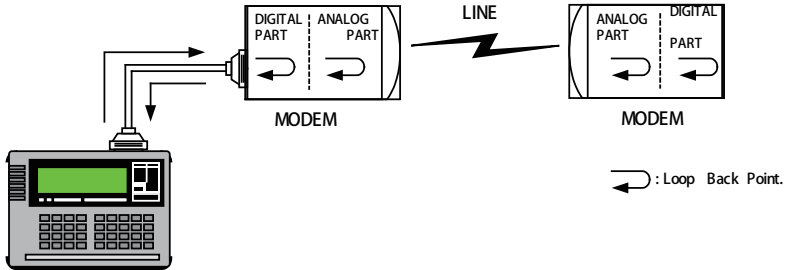
⌕ The loop-back point can be usually set and changed by using the self-test function of the modem. (Refer to the instruction manual of the modem.)
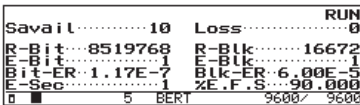
Operation

Press [MENU](top menu) and select "BERT".
Press [0] and set the communication condition. (->P9)

Press [MENU] and [8]"BERT" and set "Test Mode"(Test time, Repeat operation), "Pattern"(test pattern), FLOWCTRL" (On/Off of transmission control on RTS/CTS). The left setting indicates that it repeats 511 random test pattern for 10 minutes.

Press [RUN] to start transmitting test pattern and display the result of reception data compared to the test pattern.

Press [STOP] to end the measurement. However, the transmission of test pattern continues and RUN LED is still lighting. Press [MENU] to end transmitting the test pattern.

Name	Description	Measured Range
Savail	Effective period after synchronization is first established.	0~9999999(sec)
R-Bit	Number of received bits while synchronization is maintained.	0~9999999~9.99E9
E-Bit	Number of bit errors occurred.	0~9999999~9.99E9
Bit-ER	Bit error rate.	0.00E-0~9.99E-9
LOSS	Number of deviations from synchronization.	0~9999 2
R-Blk	Number of received blocks while synchronization is maintained.	0~9999999~9.99E9
E-Blk	Number of blocks which included bit errors.	0~9999999~9.99E9
Blk-ER	Block error rate.	0.00E-0~9.99E-9
E-Sec	Time when bit errors were detected during Savail	0~9999
%E.F.S	Error-free seconds (%)	0.000~100.000(%)

Useful Functions

○ Trigger Function

Trigger Function is for starting a specific action upon occurrence of a specific event as the trigger.For example, when receiving the specific data, it changes the external terminal or counts the error times.

```
◄ TRIGGER ►     FACTOR   ACTION
□ TRIGGER0 →0:ERROR    4:BUZZER
□ TRIGGER1   1:ERROR    5:BUZZER
□ TRIGGER2   2:ERROR    6:BUZZER
□ TRIGGER3   3:ERROR    7:BUZZER
SHIFT•0~3:TRIGGER DISABLE↔ENABLE
      F:TIMER/COUNTER SETTING
```

Press [MENU](top menu) ->[2]"Trigger".
Enable the trigger by pressing [SHIFT]+[0]-[3].
Set the trigger factor and action for each trigger by pressing [0]-[7] keys (or [ENTER].)
To use the timer/counter in the trigger condition, press [F] for detailed setting.

FACTOR	ACTION
ERROR (Parity, MP, Framing, BCC, Break), CHARACTER (Max 8 characters with don't care and bit mask) IDLE TIME (Idle time more than specified time) TM/CT (Matched with timer/counter value) LINE (Status of signal line and external trigger input)	STOP (Stop measurement. Able to set with OFFSET) TRIG SW (Enable other trigger conditions) TIMER (Start/ Stop/ Restart) COUNTER (Count/ Clear) BUZZER (Buzz sound) SAVE (Save data in memory card) SEND (Send specific data on MANUAL simulation) OT2 (Output low pulse for about 1ms to the external trigger terminal.

(e.g.,): Stop measurement when receiving "41h, 42h, 43H" on SD, and then "4Fh, 4Bh, 30h" or "4Fh, 4Bh, 32h" on RD for 3 times.

```
◄ TRIGGER ►     FACTOR   ACTION
☑ TRIGGER0 →0:ERROR    4:BUZZER
☑ TRIGGER1   1:ERROR    5:BUZZER
☑ TRIGGER2   2:ERROR    6:BUZZER
□ TRIGGER3   3:ERROR    7:BUZZER
SHIFT•0~3:TRIGGER DISABLE↔ENABLE
      F:TIMER/COUNTER SETTING
```
Enable the Trigger0/2 by pressing [SHIFT]+[0] and [SHIFT]+[2].

```
◄TIMER/COUNTER►      *INPUT*
TIMER  0:        SET COUNTER0
   SCALE:*10ms  1
TIMER  1:        1
   SCALE:*10ms  1  (1~999999)
COUNTER0:      3◄  (DECIMAL)
COUNTER1:      1
```
Set the Counter0 to be 3.

```
◄ TRIGGER 0 ►        *INPUT*
FACTOR  :CHARACTR  SET 0~8
CHAR  SD:414243◄    CHARACTER
      RD:
MASK  W0:********  (00~Fr,*,W0~W2)
      W1:********  (HEX CODE)
      W2:********  W0~W2=SHIFT•0~2
```
Condition of Trigger0
Input "41h, 42h, 43h" on SD.

```
◄ TRIGGER 0 ►        *SELECT*
ACTION  :TRIG SW   0:TRIGGER0
TRIG No  :TRIGGER1◄ 1:TRIGGER1
       :ENABLE    2:TRIGGER2
                  3:TRIGGER3
```
Action of Trigger0
Enable the Trigger1 condition.

```
◄ TRIGGER 1 ►        *INPUT*
FACTOR  :CHARACTR  SET 0~8
CHAR  SD:           CHARACTER
      RD:4f4bW0◄   (00~Fr,*,W0~W2)
MASK  W0:001100*0  (HEX CODE)
      W1:********  W0~W2=SHIFT•0~2
      W2:********  ♪   =SHIFT•F
```
Condition of Trigger1
Set "4Fh, 4Bh, WO" on RD. Set "WO" by pressing [SHIFT]+[0].

```
◄ TRIGGER 1 ►        *SELECT*
ACTION  :COUNTER ◄ 0:BUZZER
CT No    :CT0      1:STOP
       :INCRMENT  2:SAVE
                  3:TIMER
                  4:COUNTER
                  5:TRIG SW
                  6:SEND 7:OT2
```
Action of Trigger1
Set "INCREMENT" on the Counter0.

```
◄ TRIGGER 2 ►        *SELECT*
FACTOR  :TM/CT     0:ERROR
POINT  :CT0       1:CHARACTER
                  2:LINE
                  3:TM/CT MAT
                  4:IDLE TIME
```
Condition of Trigger2
Select "TM/CT" and Conter0.

```
◄ TRIGGER 2 ►        *SELECT*
ACTION  :STOP      0:QUICK
OFFSET  :QUICK     1:BEFORE
                  2:CENTER
                  3:AFTER
```
Action of Trigger2
Stop measurement immediately ("QUICK").

*External Trigger Input/Output

```
TRIGGER
IN1  | OT1
GND  | OT2
```

IN1 terminal :Used for "EX" line as trigger condition.
OT1 terminal :Output low pulse for about 1ms when any trigger condition is satisfied.
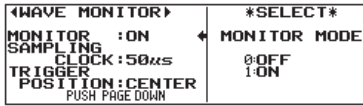OT2 terminal :Output low pulse for about 1ms as "TRG OT2" trigger action.

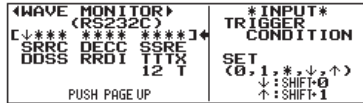*"IN1" is an input at TTL level. "OT1/2" is an open-drain output with 5V of pull-up resistor.

○ Timing Waveform Measurement

This function is to measure the timing of data as a logic analyzer through a communication line.

[Press [MENU](top menu) ->[4](WAVE MONITOR) and set "MONITOR:ON".Set the sampling clock (50ns-1ms) and trigger position (of the memory).


Press [PAGE DOWN] and select the logical status of the line to be the trigger condition.
Select the edge by pressing[SHIFT] + [0](↓) or [SHIFT] + [1] (↑).

Press [RUN] and start measuring and record logical status of the lines at the specified sampling clock in the memory.
When the trigger condition is satisfied and waveform measuring ends, "WAVE-MON END" will be displayed on the right bottom of the screen.
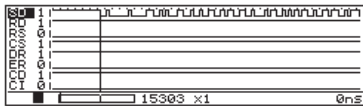
Press [STOP] to end measuring and display the waveform by pressing [Time/Count] key for a few times.

┌→   Normal Data Display   →   Timer/Counter → Timing Waveform   ┐
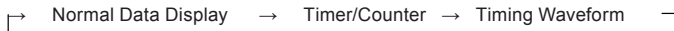
Scroll the screen by[◄] /[►] or [PAGE UP]/[PAGE DOWN] keys.
Enlarge or reduce the display by [ZOOM/CODE] or [SHIFT]+[ZOOM/CODE] keys.
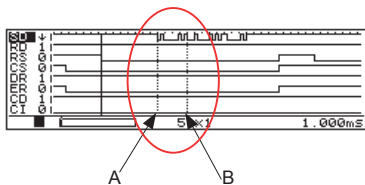
It is possible to calculate the time between two points.
Press [2]or [SHIFT]+[◄] and [3] or [SHIFT]+[►] to move the cursor to position A, then press [ENTER].
Move the cursor to position B.

A   B

○ Auto Start/Stop Function

The AUTO RUN function enables to start and stop a measurement at the specified time.
It is useful when you monitor at the specific time only.

```
◀  AUTO RUN  ▶      *SELECT*
    [01/17 10:40]
MODE      :DAILY  ◀  0:MONTHLY
RUN TIME:ON
         ** 12:30   1:DAILY
STOPTIME:ON
         ** 13:00   2:HOURLY
P-ON RUN:OFF
```

Press [MENU]->[3]->[4]("AUTO RUN").
Set Mode (repeat mode), RUN TIME (starting time), STOP TIME (end time), P-ON RUN (Auto run when powering on).

In this setting, it starts measuring at 12:30 until 13:00 every day.

○ File Management (Save/Load to the CF card)

Measured data and configuration can be saved in the CF cards. And saved files can be edited from the analyzer and PC.

```
              Copyright ©2013 LINEEYE co.,ltd.
COMPACT PROTOCOL ANALYZER
         LE-1500
SELF CHECK OK          Version 1.09
▯■                             SB11L
```

Insert the optional CF card to the memory card slot of the analyzer. Turn on the power.

Display on the screen.

None	No CF card inserted.
▯	Memory card is inserted.
▨	Unauthorized memory card is inserted.

```
◀  DIRECTORY  ▶  REMAIN 7630MB
◆ BF001  .DT    163K 13-01-28 14:43:06
  AF001  .DT     34K 13-01-28 14:44:08
  TEST10 .DT   1689K 13-02-12  9:08:02
  TEST10 .SU   1916      13-02-12  9:08:20
SELECT FUNCTION
0:SAVE 1:LOAD 2:DELETE
```

Press [LOAD/SAVE] to display the directory screen.
Select the appropriate file by [▼]/[▲] keys and press [1]->[ENTER] to load the file.
Or press [2]->[ENTER] to delete the file.

```
◀  SAVE OPTION  ▶     *INPUT*
FILENAME:TEST1▯   SET
TYPE       :  .DT  FILENAME
RANGE    :ALL
                    - CHAR -
  PUSH ENTER EXEC.
```

Press [0] to save data. Name the file by [0]-[F] keys and press [ENTER].
"TYPE:DT" stands for the measured data and "TYPE:SU" stands for the configuration data.
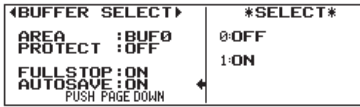
```
◀  SAVE OPTION  ▶    *SELECT*
FILENAME:TEST11    0:ALL
TYPE       :  .DT
RANGE    :CURRENT~◀  1:CURRENT~
  SIZE    :   20
  PUSH ENTER EXEC.
```

To save a partial data, select "RANGE:CURRENT" and input the data size (in 1k byte).

○ Auto Saving to the CF Card

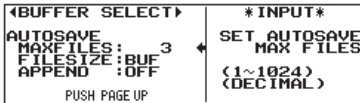Transfer the data on the captured memory into the optional CF file at specified size automatically while measuring.
It is useful for rare network trouble of unknown case by recording communication data for a long time.

```
◄BUFFER SELECT►      *SELECT*
AREA    :BUF0      0:OFF
PROTECT :OFF       1:ON
FULLSTOP:ON
AUTOSAVE:ON           ◄
     PUSH PAGE DOWN
```

Insert the optional CF card to the memory card slot of analyzer.
Press [MENU]->[3]->[0] and then "Full Stop:OFF" and "AUTO SAVE:ON".

*If setting "FULL STOP:ON", the measurement will be stopped when the capture buffer becomes full.

```
◄BUFFER SELECT►      *INPUT*
AUTOSAVE:           SET AUTOSAVE
 MAXFILES:  3  ◄        MAX FILES
 FILESIZE:BUF
 APPEND  :OFF       (1~1024)
                    (DECIMAL)
     PUSH PAGE UP
```

Press [PAGE DOWN] and set MAXFILES (Max saving files), FILESIZE, APPEND (How to use the existing file when saving new data).

*When setting the FILESIZE larger than the capture memory, captured data in the CF card cannot be loaded to the analyzer.
In this case, use the utility software (LETCVT) or optional PC link software (LE-PC300G). (Refer to the manual of each option)

Press [RUN] to start measuring and the log data in the capture memory is saved into the CF card with the name of "#XXXXXXX.DT".
("XXXXXXX" is the number which starts from 0000000). When the number of the auto-saved files is reached to the MAXFILE,
the oldest file will be deleted and new file will be saved.

```
MONITOR│SIMULATE    SETUP
►                    oCONFIG
        AUTO SAVE FILE EXIST       CE
      [RUN]:RUN  [STOP]:CANCEL     ON
E                           oF
  BERT              oAUTO CONF
```

If the memory card has the existing auto-saved files, warning message will appear before starting the measurement.
Press [RUN] to continue, or [STOP] to save data into the HDD of PC or another CF card.

* "APPEND:OFF" deletes the existing auto-saved files and starts saving from "#0000000.DT".
* "APPEND:ON" keeps the existing auto saved file and starts saving from the next number of existing file name.However, if it reaches to the MAXFILES already, it will delete the oldest file before starting the measurement.
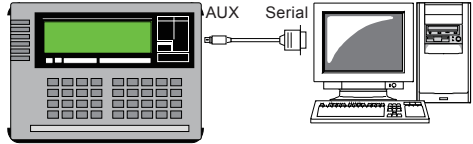
Note
  Do not turn of the power supply while using Auto Saving. It will affect not only the auto-saving file, but also the CF card itself.

○ Capture Data to the PC (Advanced Use of Print-out Function

Attached AUX Cable
(LE2-8V)

AUX   Serial

Utility software (LEPRTIN_WIN) can save the print-out data in the PC as the text files.

```
◄  AUX COND  ►        *SELECT*
SPEED    :115200◄   0:9600
CHAR BIT:8          1:19200
PARITY   :NONE      2:38400
X-CONT   :OFF       3:57600
                    4:115200
                    5:230400
```

Press [MENU]->[3]->[3] and set the AUX (RS-232) condition as left screen.
Set the SPEED as the maximum speed of COM port for the PC.

```
◄ PRINT OUT ►         *SELECT*
COLUMN  :80    ◄    0:40 CHAR
PAGESIZE:MAX        1:80 CHAR
PRINTER :DPU414     2:136 CHAR
OUTPUT  :AUX
   EOF  :ON
```

Press [MENU]->[3]->[2] and set the Print-out condition as left screen. Set "OUTPUT:AUX".
"OUTPUT:FILE" is for saving print-out data to the CF card.

Execute "LEPRTIN_WIN" from the PC.

```
►TMSP THE▲QUICK▲BROWN▲FOX▲JUMP►
  352589
►S▲OVER▲A▲LAZY▲DOG▲0123456789►
►.TMSP$0123456789ABCDEFGHIJKL►
  353474
           0  ASCII  PRINT PAGE 99999
```

Press [DISPLAY] and display the top of the data which you wish to save in the PC.
To capture data from the top, press [TOP/DEL].

Press [PRINT] and input the page number ([1]-[9][9][9][9][9]).
Press [ENTER] and print-out data will be transferred to the AUX port as text file.
Save the file by using the "LEPRTIN_WIN".
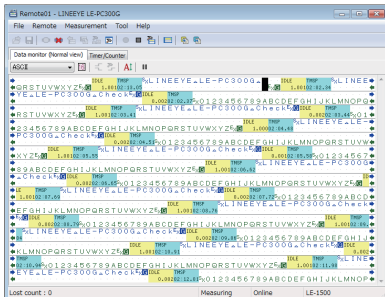
○ Remote-control from the PC

The optional PC link software (LE-PC300G) is useful to control the analyzer from the PC, and record measured data in the PC.
Also, it is possible to use/edit the files on the CF card which is saved by the Auto Saving function.

USB Cable
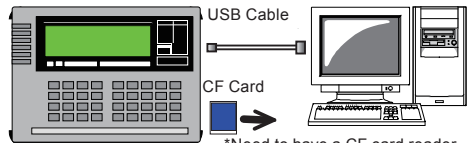
CF Card

*Need to have a CF card reader on the PC.

LE-PC300G Remote Control Screen

Troubleshooting

When you encounter some problems, please refer to "FAQ" from LINEEYE web page.
If you still cannot solve the problems, please contact LINEEYE or LINEEYE distributors.

Can monitor only transmission or reception line.
It is possible that you select Simulation function. Select Monitor function from top menu.

"B" is displayed on the screen without any communication data after pressing [RUN].
It is possible that you select "POLARITY:INVERT" at Interface setting. Press [MENU]->[1]
and select "POLARITY:NORMAL" .

Cannot send pre-registered data by pressing [SHIFT]+[9] when using MANUAL Simulation.
Press [MENU]->[1] and set "LINECTRL:OFF".
Press [MENU]->[1] and select "DRVCTRL:AUTO" if "PORT" is "RS530".

Find a small light on the LED of line state which is not in use.
Use the accessory cable. It is possible that the line standing next to it affects (crosstalk) and
lights the LED.This is not a product malfunction.

"NO ADAPTOR" is displayed after pressing [RUN].
If using the OP-SB5GL, insert the optional expansion board and connect the TTL pod as well.
Press [MENU]->[1] and set "PORT:RS232C".

"ILLEGAL CARD" is displayed after inserting the CF card and pressing [LOAD/SAVE].
Use the LINEEYE optional CF card. Max capacity of CF card depends on the analyzer model.
LINEEYE does not warranty the CF card for other manufacture.

User Registration

For any technical questions, please feel free to send us an email or FAX.

We do answer your questions via phone but prefer email or FAX.

Email: info@lineeye.co.jp FAX:+81-75-693-0161
(office hours: 9:00to12:00, 13:00to18:00)

Please register your products before asking questions about your products.

You can register your products from LINEEYE web page. Go to [Support] and fill in the
application.

You can also register your product via FAX using the registration card attached to the
products.

LINEEYE CO., LTD.

M-2315QE/LE